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22434 7590 02/09/2009

Weaver Austin Villeneuve & Sampson LLP  
P.O. BOX 70250  
OAKLAND, CA 94612-0250

EXAMINER

SERRAO, RANODHI N

ART UNIT

PAPER NUMBER

2441

DATE MAILED: 02/09/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/045,883

01/09/2002

Sanjaya Kumar

ANDIP007/425104

1172

TITLE OF INVENTION: METHODS AND APPARATUS FOR IMPLEMENTING VIRTUALIZATION OF STORAGE WITHIN A STORAGE AREA NETWORK THROUGH A VIRTUAL ENCLOSURE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	05/11/2009

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

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B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

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22434 7590 02/09/2009

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/045,883 01/09/2002 Sanjaya Kumar ANDIP007/425104 1172

TITLE OF INVENTION: METHODS AND APPARATUS FOR IMPLEMENTING VIRTUALIZATION OF STORAGE WITHIN A STORAGE AREA NETWORK THROUGH A VIRTUAL ENCLOSURE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional NO \$1510 \$300 \$0 \$1810 05/11/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
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SERRAO, RANODHI N 2441 709-226000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_
- 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

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Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/045,883	01/09/2002	Sanjaya Kumar	ANDIP007/425104	1172
22434	7590	02/09/2009	EXAMINER	
Weaver Austin Villeneuve & Sampson LLP P.O. BOX 70250 OAKLAND, CA 94612-0250			SERRAO, RANODHI N	
			ART UNIT	PAPER NUMBER
			2441	
DATE MAILED: 02/09/2009				

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 704 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 704 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/045,883	KUMAR ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	RANODHI N. SERRAO	2441	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 15 January 2009.
2. ☒ The allowed claim(s) is/are 1,3-7,9-29,31-40,42-52,54 and 56-59.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</li> <li>3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date <u>11/3/08; 1/22/09</u></li> <li>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Notice of Informal Patent Application</li> <li>6. <input type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____.</li> <li>7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment</li> <li>8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>9. <input type="checkbox"/> Other _____.</li> </ol> |
|--|---|

/William C. Vaughn, Jr./  
Supervisory Patent Examiner, Art Unit 2444

***Interview Summary***

1. A proposed amendment was submitted for applicant's consideration. Examiner suggested Applicant to amend claims as shown in the Examiner's Amendment below in order to place the application in condition for allowance.

***Examiner's Amendment***

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

3. Authorization for this examiner's amendment was given in a telephone interview with the Applicant's Representative, Elise R. Heilbrunn (Reg. No. 42,649) on 12 January 2009.

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**IN THE CLAIMS**

Please amend the claims as shown below:

1. (Previously Amended) A method of implementing storage virtualization in a storage area network, the method comprising:

creating a virtual enclosure, the virtual enclosure being a virtual entity having one or more virtual ports and being adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage

Art Unit: 2441

locations on one or more physical storage units of the storage area network, wherein creating the virtual enclosure includes receiving an indication of a number of virtual ports to be included in the virtual enclosure;

associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, thereby enabling one or more network devices within the storage area network to be associated with the virtual ports; and

assigning an address or identifier to each of the virtual ports;

wherein the step of associating includes sending a message from a first network device to a port of a second network device within the storage area network to instruct the port of the second network device to handle messages addressed to the address or identifier assigned to the associated virtual port that are received by the port of the second network device subsequent to the message sent by the first network device such that the first network device instructs the port of the second network device to act on behalf of the virtual port.

2. (Cancelled)

3. (Previously Amended) The network device as recited in claim 18, wherein the storage area network is a virtual storage area network.
4. (Previously Amended) The network device as recited in claim 18, wherein a Node World Wide Name is associated with the virtual enclosure.
5. (Previously Presented) The network device as recited in claim 18 wherein a Port World Wide Name is assigned to each of the virtual ports such that the Port World Wide Name is associated with an associated port of a network device within the storage area network.
6. (Previously Presented) The network device as recited in claim 18, wherein the port of the second network device within the storage area network is a port of a fibre channel device.
7. (Previously Amended) The network device as recited in claim 18, wherein an FCID is assigned to each of the virtual ports.
8. (Cancelled)

Art Unit: 2441

9. (Previously Amended) The network device as recited in claim 18, wherein the number of virtual ports of the virtual enclosure is greater than a number of ports of each network device within the storage area network.

10. (Previously Presented) The method as recited in claim 1, wherein associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network comprises:

associating the virtual ports with ports of one or more network devices within the storage area network.

11. (Previously Amended) The network device as recited in claim 18, wherein associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network comprises:

sending a bind message to a port of a network device within the storage area network, thereby binding the port of a network device within the storage area network to one or more of the virtual ports.

12. (Previously Amended) The network device as recited in claim 11, further comprising:

sending a trap message to one or more additional ports of one or more network devices within the storage area network, thereby instructing the one or more additional



Art Unit: 2441

ports of one or more network devices within the storage area network to trap messages directed to one of the virtual ports.

13. (Previously Amended) The network device as recited in claim 18, wherein one or more of the virtual storage units each comprises a VLUN or other virtual representation of storage on the storage area network.

14. (Original) The method as recited in claim 1, further comprising:  
assigning one or more virtual storage units to the virtual enclosure.

15. (Original) The method as recited in claim 14, wherein the one or more virtual storage units each comprise a VLUN or other virtual representation of storage on the storage area network.

16. (Previously Amended) A computer-readable storage medium storing thereon computer-readable instructions for implementing storage virtualization in a storage area network, comprising:

instructions for creating a virtual enclosure, the virtual enclosure being a virtual entity having one or more virtual ports and adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network,

Art Unit: 2441

wherein creating the virtual enclosure includes receiving information indicating a number of virtual ports to be included in the virtual enclosure;

instructions for associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, thereby enabling one or more network devices within the storage area network to be associated with the virtual ports; and

instructions for assigning an address or identifier to each of the virtual ports;

wherein the instructions for associating include instructions for sending a message from a first network device to a port of a second network device within the storage area network to instruct the port of the second network device to handle messages addressed to the address or identifier assigned to the associated virtual port that are received by the port of the second network device subsequent to the message sent by the first network device such that the first network device instructs the port of the second network device to act on behalf of the virtual port.

Art Unit: 2441

17. (Currently Amended) An apparatus for implementing storage virtualization in a storage area network, wherein said apparatus includes a processor and a memory unit, comprising:

means for creating a virtual enclosure, the virtual enclosure being a virtual entity having one or more virtual ports and adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein creating the virtual enclosure includes receiving information indicating a number of virtual ports to be included in the virtual enclosure;

means for associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, thereby enabling one or more network devices within the storage area network to be associated with the virtual ports; and

means for assigning an address or identifier to each of the virtual ports;

wherein the means for associating include means for sending a message from a first network device to a port of a second network device within the storage area network to instruct the port of the second network device to handle messages

Art Unit: 2441

addressed to the address or identifies assigned to the associated virtual port that are received by the port of the second network device subsequent to the message sent by the first network device such that the first network device instructs the port of the second network device to act on behalf of the virtual port.

18. (Previously Amended) A network device adapted for implementing storage virtualization in a storage area network, comprising:

- a processor; and

- a memory, at least one of the processor and the memory being adapted for:

- creating a virtual enclosure, the virtual enclosure being a virtual entity having one or more virtual ports and adapted for representing one or more virtual storage units, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein creating the virtual enclosure includes receiving information indicating a number of virtual ports to be included in the virtual enclosure;

- associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, thereby enabling one or more network devices within the storage area network to be associated with the virtual ports; and

- assigning an address or identifier to each of the virtual ports;

wherein the associating step includes sending a message from a first network device to a port of a second network device within the storage area network to instruct the port of the second network device to handle messages addressed to the address or identifier assigned to the associated virtual port that are received by the port of the second network device subsequent to the message sent by the first network device such that the first network device instructs the port of the second network device to act on behalf of the virtual port.

19. (Previously Amended) A method of performing LUN mapping in a storage area network, the method comprising:

accessing a LUN mapping table having one or more entries, each of the entries identifying an initiator in the storage area network, one or more of a set of one or more virtual ports of a virtual enclosure. and associating a specified logical unit with one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein the virtual enclosure is a virtual entity adapted for representing the set of one or more virtual storage units and each of the virtual ports is associated with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other

Art Unit: 2441

virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, wherein the port of the network device has received a message from another network device instructing the port to handle messages addressed to the associated virtual port that are received by the port of the network device subsequent to the message sent by the another network device such that the another network device instructs the port of the network device to act on behalf of the virtual port; and

when a request for the specified logical unit is received from the initiator via one of the associated virtual ports, identifying one of the entries in the LUN mapping table and employing the one or more virtual storage units specified in the entry to service the request.

20. (Previously Amended) A computer-readable storage medium storing thereon instructions for performing LUN mapping in a storage area network, comprising:

instructions for accessing a LUN mapping table having one or more entries. each of the entries identifying an initiator in the storage area network, one or more of a set of one or more virtual ports of a virtual enclosure, and associating a specified logical unit with one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable. each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein the virtual enclosure is a virtual entity adapted for representing the set of one or more virtual storage units and each of the virtual ports is associated

Art Unit: 2441

with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, wherein the port of the network device has received a message from another network device instructing the port to handle messages addressed to the associated virtual port that are received by the port of the network device subsequent to the message sent by the another network device such that the another network device instructs the port of the network device to act on behalf of the virtual port; and

instructions for identifying one of the entries in the LUN mapping table and employing the one or more virtual storage units specified in the entry to service the request when a request for the specified logical unit is received from the initiator via one of the associated virtual ports.

21. (Currently Amended) In a first network device, a method of implementing storage virtualization in a storage area network, said first network device includes a processor and a memory unit, the method comprising:

sending a virtualization message to a port of a second network device within the storage area network, the virtualization message instructing the port to handle messages addressed to a virtual port of a virtual enclosure, the virtual enclosure being a

Art Unit: 2441

virtual entity having one or more virtual ports and being adapted for representing one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein each of the virtual ports is associated with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, wherein the virtualization message indicates that the port is to handle messages addressed to an address or identifier assigned to the virtual port that are received by the port of the second network device subsequent to the virtualization message sent by the first network device such that the first network device instructs the port of the second network device to act on behalf of the virtual port; and

receiving a virtualization response from the port of the second network device in response to the virtualization message.

22. (Previously Amended) The apparatus as recited in claim 34, wherein the virtual port is identified by a NWWN and a PWWN.



Art Unit: 2441

23. (Previously Presented) The apparatus as recited in claim 34, wherein the virtualization response indicates that the port is configured to handle messages addressed to the virtual port of the virtual enclosure.

24. (Previously Presented) The apparatus as recited in claim 34, wherein the virtualization message indicates that the port is to obtain an address or identifier assigned to the virtual port.

25. (Previously Amended) The apparatus as recited in claim 24, wherein the virtualization message is a bind message or a trap message.

26. (Previously Amended) The apparatus as recited in claim 24, wherein the virtualization response comprises the address or identifier assigned to the virtual port.

27. (Previously Presented) The apparatus as recited in claim 34, wherein the virtualization message indicates that the port is to obtain an address or identifier assigned to the virtual port from a DNS server.

28. (Previously Amended) The method as recited in claim 21, further comprising: receiving an address or identifier assigned to the virtual port.

29. (Previously Amended) The apparatus as recited in claim 24, wherein the address or identifier is an FCID.

30. (Cancelled)

31. (Previously Amended) The apparatus as recited in claim 21, wherein the address or identifier is an FCID.

32. (Previously Amended) A computer-readable storage medium storing thereon computer-readable instructions for implementing storage virtualization in a first network device of a storage area network, comprising:

instructions for sending a virtualization message to a port of a second network device within the storage area network, the virtualization message instructing the port to handle messages addressed to a virtual port of a virtual enclosure that are received by the port of the second network device subsequent to the virtualization message sent by the first network device such that the first network device instructs the port of the second network device to act on behalf of the virtual port, the virtual enclosure being a virtual entity having one or more virtual ports and being adapted for representing one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein each of the virtual ports is associated with a port of a network device within the storage-area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or

Art Unit: 2441

more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations; and

instructions for receiving a virtualization response from the port of the second network device in response to the virtualization message.

33. (Currently Amended) An apparatus adapted for implementing storage virtualization in a first network device of a storage area network, wherein said apparatus includes a processor and a memory unit, comprising:

means for sending a virtualization message from the first network device to a port of a second network device within the storage area network, the virtualization message instructing the port to handle messages addressed to a virtual port of a virtual enclosure that are received by the port of the second network device subsequent to the virtualization message sent by the first network device such that the first network device instructs the port of the second network device to act on behalf of the virtual port. the virtual enclosure being a virtual entity having one or more virtual ports and being adapted for representing one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein each of the virtual ports is associated with a port of a network device within the storage area network to create a set of virtual

Art Unit: 2441

port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations; and

means for receiving a virtualization response from the port of the second network device in response to the virtualization message.

34. (Previously Amended) An apparatus adapted for implementing storage virtualization in a first network device of a storage area network, comprising:

a processor; and

a memory, at least one of the processor and the memory being adapted for:

sending a virtualization message from the first network device to a port of a second network device within the storage area network, the virtualization message instructing the port to handle messages addressed to a virtual port of a virtual enclosure that are received by the port of the second network device subsequent to the virtualization message sent by the first network device such that the first network device instructs the port of the second network device to act on behalf of the virtual port. the virtual enclosure being a virtual entity having one or more virtual ports and being adapted for representing one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable, each of the virtual storage

Art Unit: 2441

units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein each of the virtual ports is associated with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, wherein the virtualization message indicates that the port is to handle messages addressed to an address or identifier assigned to the virtual port that are subsequently received by the port; and receiving a virtualization response from the port of the second network device in response to the virtualization message.

35. (Previously Amended) A method of implementing storage virtualization in a first network device of a storage area network. the method comprising:

receiving a virtualization message at a port of the first network device from a second network device within the storage area network, the virtualization message instructing the port to handle messages addressed to a virtual port of a virtual enclosure that are received by the port of the first network device subsequent to the virtualization message sent by the second network device such that the second network device instructs the port of the first network device to act on behalf of the virtual port. the virtual enclosure being a virtual entity having one or more virtual ports and being adapted for

Art Unit: 2441

representing one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein each of the virtual ports is associated with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, wherein the virtualization message indicates that the port is to handle messages addressed to an address or identifier assigned to the virtual port that are subsequently received by the port; and

    sending a virtualization response from the port of the first network device to the second network device in response to the virtualization message.

36. (Previously Presented) The network device as recited in claim 52, wherein the virtualization message indicates that the port is to obtain an address or identifier assigned to the virtual port.

37. (Previously Amended) The method as recited in claim 35, further comprising: obtaining and storing the address or identifier assigned to the virtual port.

38. (Previously Presented) The network device as recited in claim 52, wherein the virtualization message indicates that the port is to obtain an address or identifier assigned to the virtual port from a DNS server.

39. (Previously Amended) The method as recited in claim 37, further comprising: sending the address or identifier assigned to the virtual port.

40. (Previously Amended) The method as recited in claim 37, wherein the address or identifier is an FCID.

41. (Cancelled)

42. (Previously Presented) The network device as recited in claim 52, wherein the address or identifier is an FCID.

43. (Previously Amended) The method as recited in claim 35, further comprising: handling messages addressed to the address or identifier assigned to the virtual port.

44. (Previously Amended) The method as recited in claim 35, further comprising: handling messages addressed to the virtual port of the virtual enclosure.

Art Unit: 2441

45. (Previously Amended) The method as recited in claim 37, further comprising:  
handling messages addressed to the address or identifier assigned to the virtual port.

46. (Previously Amended) The method as recited in claim 35, further comprising:  
receiving a report message requesting an identification of one or more of the virtual  
storage units supported by an address or identifier assigned to one of the virtual ports;  
sending a reply message identifying one or more of the virtual storage units.

47. (Original) The method as recited in claim 46, wherein the address or identifier is  
an FCID.

48. (Previously Amended) The network device as recited in claim 52, wherein one or  
more of the virtual storage units comprises a VLUN or other virtual representation of  
storage on the storage area network.

49. (Original) The method as recited in claim 46, wherein the one or more of the  
virtual storage units identified in the reply message are those virtual storage units that  
are visible to an initiator sending the report message.

50. (Previously Amended) A computer-readable storage medium storing thereon  
computer readable instructions for implementing storage virtualization in a first network  
device of a storage area network, comprising:



instructions for receiving a virtualization message at a port of the first network device from a second network device within the storage area network, the virtualization message instructing the port to handle messages addressed to a virtual port of a virtual enclosure that are received by the port of the first network device subsequent to the virtualization message sent by the second network device such that the second network device instructs the port of the first network device to act on behalf of the virtual port, the virtual enclosure being a virtual entity having one or more virtual ports and being adapted for representing one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein each of the virtual ports is associated with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, wherein the virtualization message indicates that the port is to handle messages addressed to an address or identifier assigned to the virtual port that are subsequently received by the port; and

instructions sending a virtualization response from the port of the first network device to the second network device in response to the virtualization message.

Art Unit: 2441

51. (Currently Amended) A network device adapted for implementing storage virtualization in a first network device of a storage area network, wherein said network device includes a processor and a memory unit, comprising:

means for receiving a virtualization message at a port of the first network device from a second network device within the storage area network, the virtualization message instructing the port to handle messages addressed to a virtual port of a virtual enclosure that are received by the port of the first network device subsequent to the virtualization message sent by the second network device such that the second network device instructs the port of the first network device to act on behalf of the virtual port, the virtual enclosure being a virtual entity having one or more virtual ports and being adapted for representing one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein each of the virtual ports is associated with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations wherein the virtualization message indicates that the port is to handle

Art Unit: 2441

messages addressed to an address or identifier assigned to the virtual port that are subsequently received by the port; and

means for sending a virtualization response from the port of the first network device to the second network device in response to the virtualization message.

52. (Previously Amended) A network device adapted for implementing storage virtualization in a first network device of a storage area network, comprising:

a processor; and

a memory, at least one of the processor and the memory being adapted for:

receiving a virtualization message at a port of the first network device from a second network device within the storage area network, the virtualization message instructing the port to handle messages addressed to a virtual port of a virtual enclosure that are received by the port of the first network device subsequent to the virtualization message sent by the second network device such that the second network device instructs the port of the first network device to act on behalf of the virtual port, the virtual enclosure being a virtual entity having one or more virtual ports and being adapted for representing one or more virtual storage units, wherein a number of virtual ports to be included in the virtual enclosure is configurable, each of the virtual storage units representing one or more physical storage locations on one or more physical storage units of the storage area network, wherein each of the virtual ports is associated with a port of a network device within the storage area network to create a set of virtual port associations such that the virtual ports of the virtual enclosure are associated with one

Art Unit: 2441

or more ports of one or more network devices within the storage area network, wherein each of the virtual ports is associated with the same port or a different port from other virtual port associations and wherein each of the virtual ports is associated with the same network device or a different network device from other virtual port associations, wherein the virtualization message indicates that the port is to handle messages addressed to an address or identifier assigned to the virtual port that are subsequently received by the port; and

    sending a virtualization response from the port of the first network device to the second network device in response to the virtualization message.

53.     (Cancelled)

54.     (Previously Presented) The method as recited in claim 1, wherein the virtual enclosure is configured to represent the one or more virtual storage units.

55.     (Cancelled)

56.     (Previously Presented) The method as recited in claim 1, wherein associating each of the virtual ports of the virtual enclosure with a port of a network device within the storage area network comprises:

    associating the virtual ports with ports of two or more network devices within the storage area network.

57. (Previously Presented) The method as recited in claim 56, further comprising:  
associating a single one of the virtual ports with at least one of the ports.

58. (Previously Presented) The method as recited in claim 56, further comprising:  
associating a single one of the virtual ports with two or more of the ports of the  
two or more network devices.

59. (Previously Presented) The method as recited in claim 21, wherein each of the  
virtual ports is associated with a port of a network device within the storage area  
network such that the virtual ports of the virtual enclosure are associated with one or  
more ports of one or more network devices within the storage area network, wherein  
each of the virtual ports is associated with the same port or a different port from other  
virtual port associations and wherein each of the virtual ports is associated with the  
same network device or a different network device from other virtual port associations.

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***Allowable Subject Matter***

4. Claims 1, 3-7, 9-29, 31-40, 42-52, 54, and 56-59 are allowed. The following is an  
examiner's statement of reasons for allowance: In interpreting the claims, in light of the  
specification, the Examiner finds the claimed invention to be patentably distinct from the  
prior art of record.

Art Unit: 2441

5. For the purposes of statutory subject matter, the examiner interprets the claim language of “a computer-readable storage medium” in independent claims 16, 20, 32, and 50 to be hardware as defined in the application’s specification on page 42, lines 12-19 which state, “For instance, instructions and data for implementing the above-described invention may be stored on a disk drive, a hard drive, a floppy disk, a server computer, or a remotely networked computer.”

6. **Blumenau et al. (6,260,120)** teaches a storage controller for controlling access to data storage has a memory and at least one data port for a data network including host processors. The memory is programmed to define a respective specification for each host processor of a respective subset of the data storage to which access by the host processor is restricted, and each specification is associated with a host identifier stored in the memory. When the storage controller receives a data access request from a host processor, it decodes a host identifier from the data access request, and searches the memory for a host identifier matching the host identifier decoded from the request. Upon finding a match, the respective specification of the respective subset for the host processor is accessed to determine whether or not storage specified by the storage access request is contained in the respective subset. If so, then storage access can continue, and otherwise, storage access is denied. Preferably the host identifier decoded from the request is a temporary address assigned by the network, and also stored in the memory in association with each respective specification is a relatively permanent identifier for the host processor (**Blumenau, abstract, figure 11, and corresponding text**).

Art Unit: 2441

7. **Terrell et al. (7,200,144)** teaches a router for use in a network includes a scalable architecture and performs methods for implementing quality of service on a logical unit behind a network port; and for implementing storage virtualization. The architecture includes a managing processor, a supervising processor; and a plurality of routing processors coupled to a fabric. The managing processor has an in-band link to a routing processor. A routing processor receives a frame from the network, determines by parsing the frame, the protocol and logical unit number, and routes the frame to a queue according to a traffic class associated with the logical unit number in routing information prepared for the processors. An arbitration scheme empties the queue in accordance with a deficit round robin technique. If a routing processor detects the frame's destination is a virtual entity, and so is part of a virtual transaction, the router conducts a nonvirtual transaction in concert with the virtual transaction. The nonvirtual transaction accomplishes the intent of the virtual transaction but operates on an actual network port, for example, a storage device (**Terrell, abstract, figure 24, and corresponding text**).

8. However, the prior art of record fail to teach or suggest individually or in combination the claimed limitations of independent claims, wherein the step of associating includes sending a message from a first network device to a port of a second network device within the storage area network to instruct the port of the second network device to handle messages addressed to the address or identifier assigned to the associated virtual port that are received by the port of the second network device subsequent to the message sent by the first network device such that the first network

Art Unit: 2441

device instructs the port of the second network device to act on behalf of the virtual port, correlating to page 20, lines 1-12 of applicant's specification which states, "As shown, data or messages are received by an intelligent, virtualization port via a bi-directional connector 302. In addition, the virtualization port is adapted for handling messages on behalf of a virtual enclosure port, as will be described in further detail below. In association with the incoming port, Media Access Control (MAC) block 304 is provided, which enables frames of various protocols such as Ethernet or fibre channel to be received. In addition, a virtualization intercept switch 306 determines whether an address specified in an incoming frame pertains to access of a virtual storage location of a virtual storage unit representing one or more physical storage locations on one or more physical storage units of the storage area network. For instance, the virtual storage unit may be a virtual storage unit (e.g., VLUN) that is enclosed within a virtual enclosure."

9. These limitations, in conjunction with the other limitations in the independent claims 1, 16-21, 32-35, and 50-52 are not specifically disclosed or remotely suggested in the prior art of record. Therefore, claims 1, 3-7, 9-29, 31-40, 42-52, 54, and 56-59 are allowed.

10. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."



Art Unit: 2441

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ranodhi Serrao whose telephone number is (571) 272-7967. The examiner can normally be reached on 8:00-4:30pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rupal Dharia can be reached on (571) 272-3880. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/R. N. S./

Examiner, Art Unit 2441

01/22/2009

/William C. Vaughn, Jr./

Supervisory Patent Examiner, Art Unit 2444